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EXAMINER
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RAMIREZ, JOHN FERNANDO

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3737

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments with respect to claims 1 and 3-18 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

**Claims 1 and 3-18** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The phrases “the first and second motion signals being generated by **a first type of device**”, the image sequence being generated by **a second type of device**” are considered to be new matter.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1, 4, 8 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by non-patent literature Vullings et al. “*Automated ECG segmentation with Dynamic Time Warping*”.**

Vullings et al. disclose a method of determining a corresponding image for a reference image from an image sequence of a moving object by means of a first and a second motion signal (see Figure 4, see section: The DTW algorithm, see abstract), in which the first and the second motion signal represent the respective variation in time of the states of motion of a first motion and a second motion of the object (see Figures 5 and 6), the image sequence represents the first motion of the object as a sequence of images of states of motion (see Figures 5 and 7, see sections: The DTW algorithm, The reference heartbeat), the reference image represents a state of motion from the second object motion and is acquired at a reference instant during the second motion of the object, including the following steps: a) examining the first and the second motion signal for similarities to determine a similarity function by means of a dynamic time warping method (see Figure 4, see section: The DTW algorithm, see abstract), b) calculating a correspondence instant in the first motion signal by means of the similarity function, the correspondence instant corresponding to the acquisition instant of the reference image from the second motion signal (see Figures 5 and 7, see sections: The DTW algorithm, The reference heartbeat), and c) defining the corresponding image by identification of the image sequence whose acquisition instant corresponds at least approximately to the correspondence instant (see Figures 5 and 7, see sections: The DTW algorithm, The reference heartbeat), wherein the corresponding image represents at least

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approximately that state of motion of the moving object which is represented in the reference image (see Figure 7, see sections: The reference heartbeat, results).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 3, 5-7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vullings et al. “*Automated ECG segmentation with Dynamic Time Warping*” in view of Beier “*Advanced Subtraction Angiography: Mask selection and Image Registration*”, in further view of Urbano et al. (US 6,228,030), Dittrich et al. (5,776,063).**

Vullings et al. teaches all the limitations of the claimed subject matter except for mentioning specifically the steps of wherein an interpolation image is formed from the corresponding image and a further image from the image sequence, wherein the blood vessels of the heart are filled at least partly with a contrast medium, wherein the image sequence forms an X-ray image sequence or an ultrasound image sequence.

However, the steps of wherein an interpolation image is formed from the corresponding image and a further image from the image sequence, wherein the blood vessels of the heart are filled at least partly with a contrast medium, wherein the image sequence forms an X-ray image sequence or an ultrasound image sequence are

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considered conventional in the art as evidenced by the teachings of Beier et al. and Urbano et al. or Dittrich et al.

The Beier et al. publication teaches the step of forming an interpolation image and wherein the blood vessels of the heart are filled at least partly with a contrast medium (see abstract, see sections: Introduction and Frame Selection, see first paragraph on page 107). Moreover, the Urbano et al. (see abstract) and Dittrich et al. (see abstract, see figs. 4 and 11, col. 5, lines 29-38) patents teach wherein the blood vessels of the heart are filled at least partly with a contrast medium, wherein the image sequence forms an X-ray image sequence or an ultrasound image sequence.

Based on the above observations, for a person of ordinary skill in the art, modifying the method disclosed by Vullings, with the above discussed enhancements would have been considered obvious in order to improve image quality.

**Claims 11-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vullings et al. “*Automated ECG segmentation with Dynamic Time Warping*” in view of E. G. Schukat-Talamazzini “*Automatische Spracherkennung*”.**

Vullings et al. does not specifically disclose a method of dynamic time warping with the steps of performing recursion analysis to obtain the similarity function, and wherein the similarity function is monotonic. However, algorithms with the steps of recursion analysis and monotonic properties are conventional in the art as evidenced by E. G. Schukat-Talamazzini (see figures 5.2, 5.3 and 5.4). Based on the above observations, for a person of ordinary skill in the art, modifying the method disclosed by

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Vullings et al. with the above discussed enhancements would have been considered obvious because such modifications would have provided more accurate results and minimize errors to detect an abnormal condition of the heart.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN F. RAMIREZ whose telephone number is (571)272-8685. The examiner can normally be reached on (Mon-Fri) 7:00 - 3:30 p.m.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian L. Casler can be reached on (571) 272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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